Workshop report: Training in development and use of Growing Season Onset and Downscaled Seasonal Forecast Maprooms, Kigali, Rwanda, March 2017

March 2017

John del Corral
Alison Rose

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CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)

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Abstract

In March 2017, a training was provided in Rwanda as part of the Rwanda Climate Services for Agriculture project, a U.S. Agency for International Development (USAID)-funded initiative that seeks to improve agricultural planning and food security management in the face of a variable and changing climate at both local and government levels. The project addresses both supply- and demand-side capacity regarding climate information. On the supply side, it is enhancing Rwanda Meteorology Agency (Meteo Rwanda)'s capacity to provide climate information tailored to agricultural needs by helping develop high-quality merged gridded historic datasets and an expanding suite of derived online products. Training participants included CIAT, the Ministry of Agriculture and Animal Resources (MINAGRI), the Rwanda Agricultural Board, and Meteo Rwanda on using downscaled seasonal forecasts. The training focused on using and understanding the new Historical Onset Date Maproom and the Seasonal Forecast Maproom.

Keywords

Climate services, Seasonal forecasting; Downscaling; Capacity building; ENACTS

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Contents

Acronyms

CIAT	International Center for Tropical Agriculture
ENACTS	Enhancing National Climate Services
IRI	International Research Institute for Climate and Society
Meteo Rwanda	Rwanda Meteorological Agency
MINAGRI	Ministry of Agriculture and Animal Resources
USAID	U.S. Agency for International Development

Introduction

This report describes training activities in Kigali, Rwanda, March 2017, led by the International Research Institute for Climate and Society (IRI)'s John del Coral. The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), in collaboration with IRI, held trainings for International Center for Tropical Agriculture (CIAT), the Ministry of Agriculture and Animal Resources (MINAGRI), the Rwanda Agricultural Board, and Rwanda Meteorology Agency (Meteo Rwanda) in development and use of Growing Season Onset and Downscaled Seasonal Forecast Maprooms. The training was held in Kigali, Rwanda, from March 1–10, 2017. The training visit was part of the Rwanda Climate Services for Agriculture project – a four-year initiative (2016-2019) funded by the U.S. Agency for International Development (USAID) that seeks to transform Rwanda's rural farming communities and national economy through climate services and improved climate risk management.

The project's approach to strengthen the supply of actionable climate information for the agriculture sector builds on and extends the IRI-led Enhancing National Climate Services (ENACTS) initiative. Prior work developed high-quality merged gridded historic datasets and a suite of derived online products that can be accessed for any 4-km grid-cell through an online maproom interface. The maprooms are available on Meteo Rwanda's website.

The objectives of the training visit were to: (a) provide training to staff from CIAT, MINAGRI, Rwanda Agricultural Board, and Meteo Rwanda for the new Historical Onset Date Maproom and the Seasonal Forecast Maproom and (b) provide training to Meteo Rwanda staff for Data Library system administration. The visit also included creation of a backup of the Data Library system and ENACTS data and setting up an internal Data Library server for use by Meteo Rwanda to extract ENACTS data. Trainings were held at the offices of CIAT and Meteo Rwanda in Kigali, Rwanda. Details on participants are included in Appendix 1. The training was led by Dr. John del Corral from IRI.

Historical Onset Date Maproom

During the training, participants were introduced to the new Historical Onset Date Maproom. The maproom explores historical rainy season onset date based on a user-defined definition of

onset. The date when the rainy season starts is critical to agriculture planning, in particular for planting. The map of Rwanda (Fig. 1) shows the mean historical onset date expressed as number of days since the user-defined start date. The map is generated based on the definition of onset. Both the start date and definition of onset are easily specified by the user in the maproom menu choices. Once the user clicks on a location in Rwanda, a time series graph is generated for that specific location (Fig. 2). The graph shows the actual onset date for each year from 1983 to 2015, expressed in days since the user-defined Start Date.

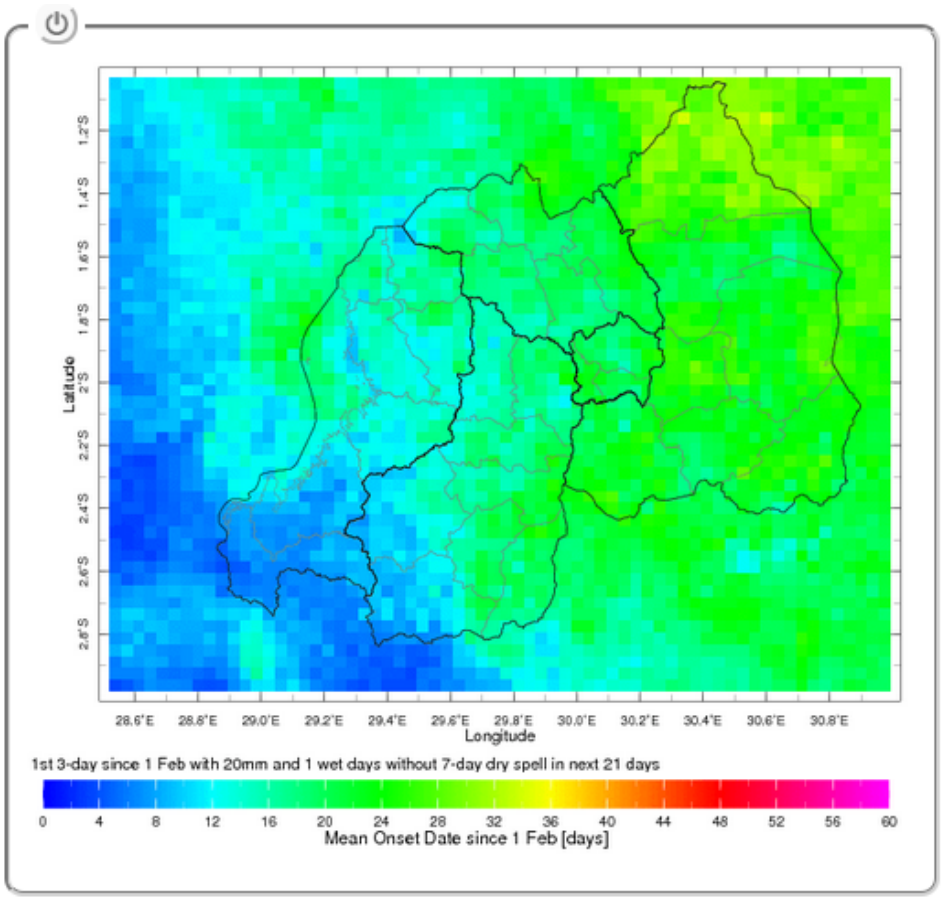

Figure 1. Historical Onset Date Maproom.

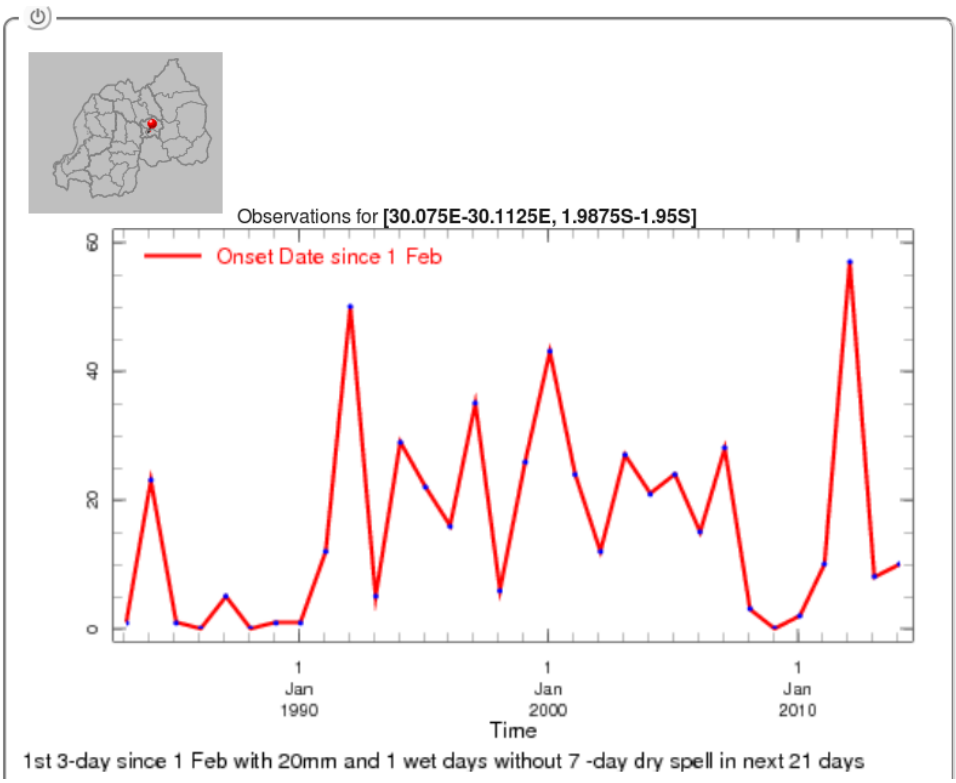

Figure 2. Historical Onset Date Maproom time series graph.

Staff were trained with basic exercises to learn how to use the maproom for rainy seasons.

The steps in the exercise were:

1. (a) Pick a rainfall value somewhere in the middle (either total season or dekad) and select non-exceeding and report in which part of the country there is the greatest and least probability of non-exceedance. (b) Repeat 1a, but with a higher rainfall value. (c) Repeat 1a, but with a lower rainfall value.
2. Repeat step 1, but this time with probability of exceedance mode instead of probability of non-exceedance.
3. Repeat exercises 1 and 2 but with percentiles 50th%ile, 80th%ile and 20th%ile.
4. Share your understanding of Rwanda's climate (E to W) and this SOND 2016 forecast.
5. Compare the SOND 2016 forecast to the SOND 2015 forecast.
6. Compare answers to your own experience, share what you have learned and suggest any improvements.

Preciptitation Forecast Maproom

The Precipitation Forecast Maproom displays a seasonal forecast of precipitation a month before the season starts. The forecast is based on historical data and current climate conditions. The maproom displays a map of Rwanda with the forecast probability of exceeding or not exceeding a percentile or amount of precipitation for the coming season. The user can set the percentile value or rainfall amount threshold with the maproom's menu options. The map can show which parts of Rwanda might be facing a drought (not-exceeding) or flooding (exceeding) (Fig. 4).

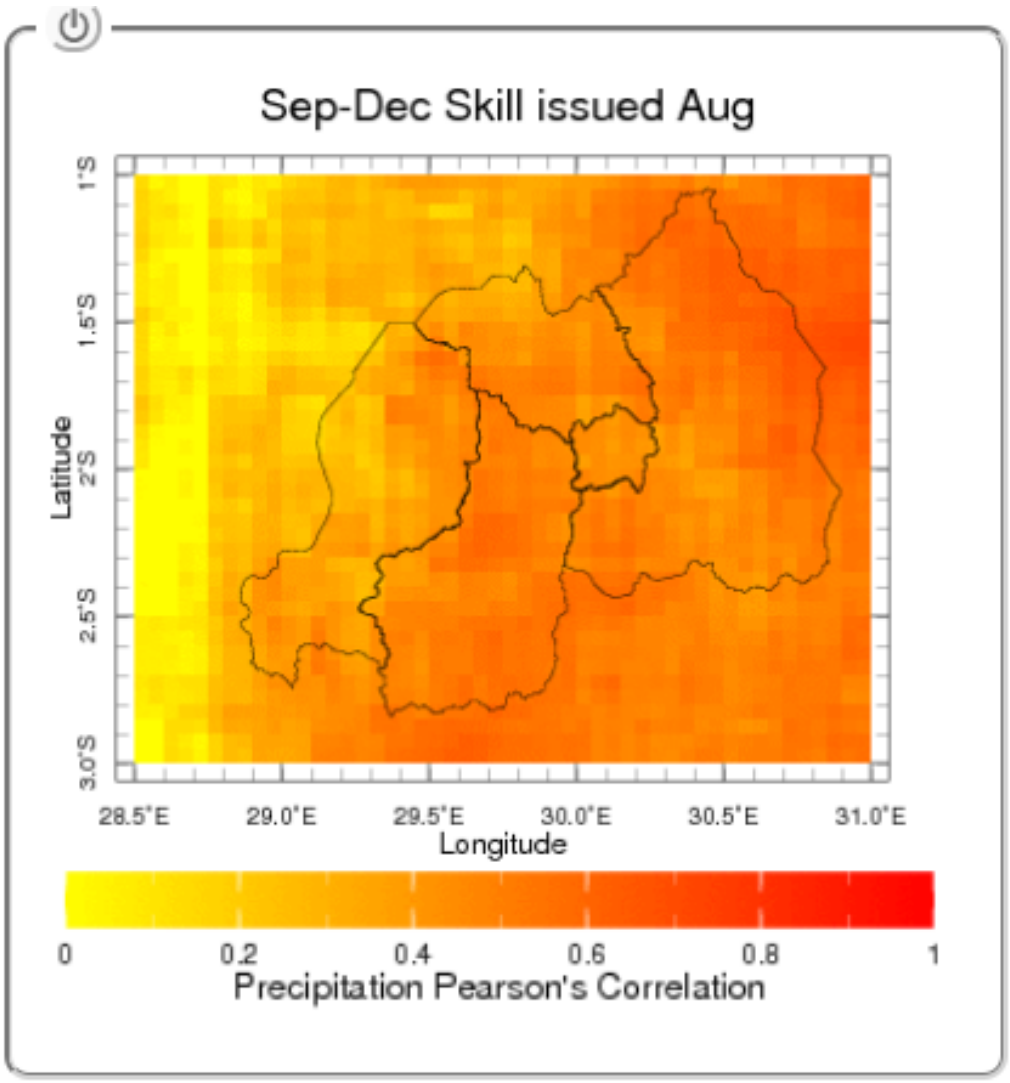

Figure 3: Skill map in Precipitation Forecast Maproom.

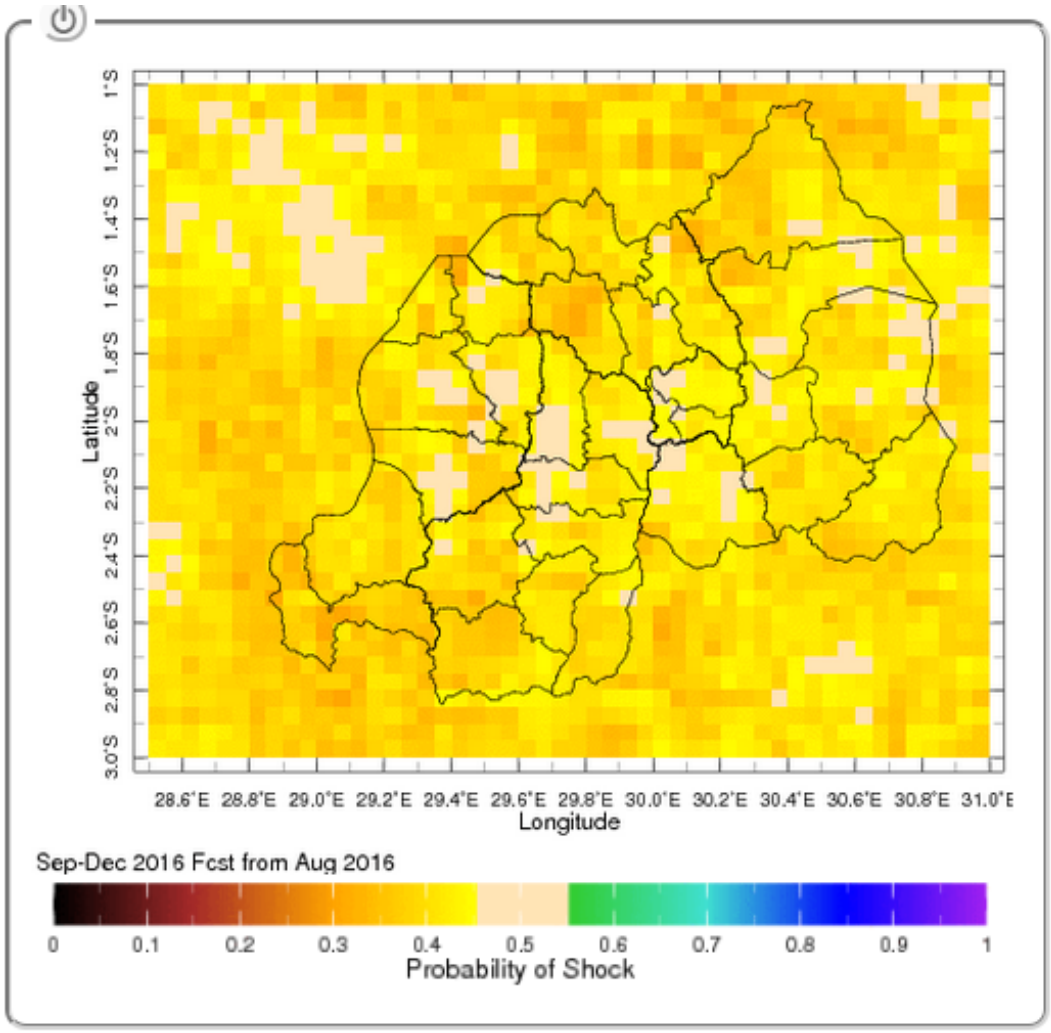

Figure 4: Probability of deficit rainfall in the Precipitation Forecast Maproom.

The user is able to view the forecast for the current year or previous year(s) by using the menu options. By clicking on a location on the Rwanda map, the user will get a probability of exceedance graph and a probability distribution graph for the forecast precipitation at the specific location that the user clicked on. The user can display the seasonal total or mm/dekad on these graphs using the maproom's menu.

The Precipitation Forecast Maproom training focused on understanding the tool's functionality. This included: 1) Looking at the spatial distribution of probabilities across Rwanda; 2) Understanding how to use 'non-exceeding' and ''exceeding'; 3) Understanding the 'probability of exceedance' and 'probability distribution' graphs; and 4) Examining the effect of El Nino on global precipitation in 2015.

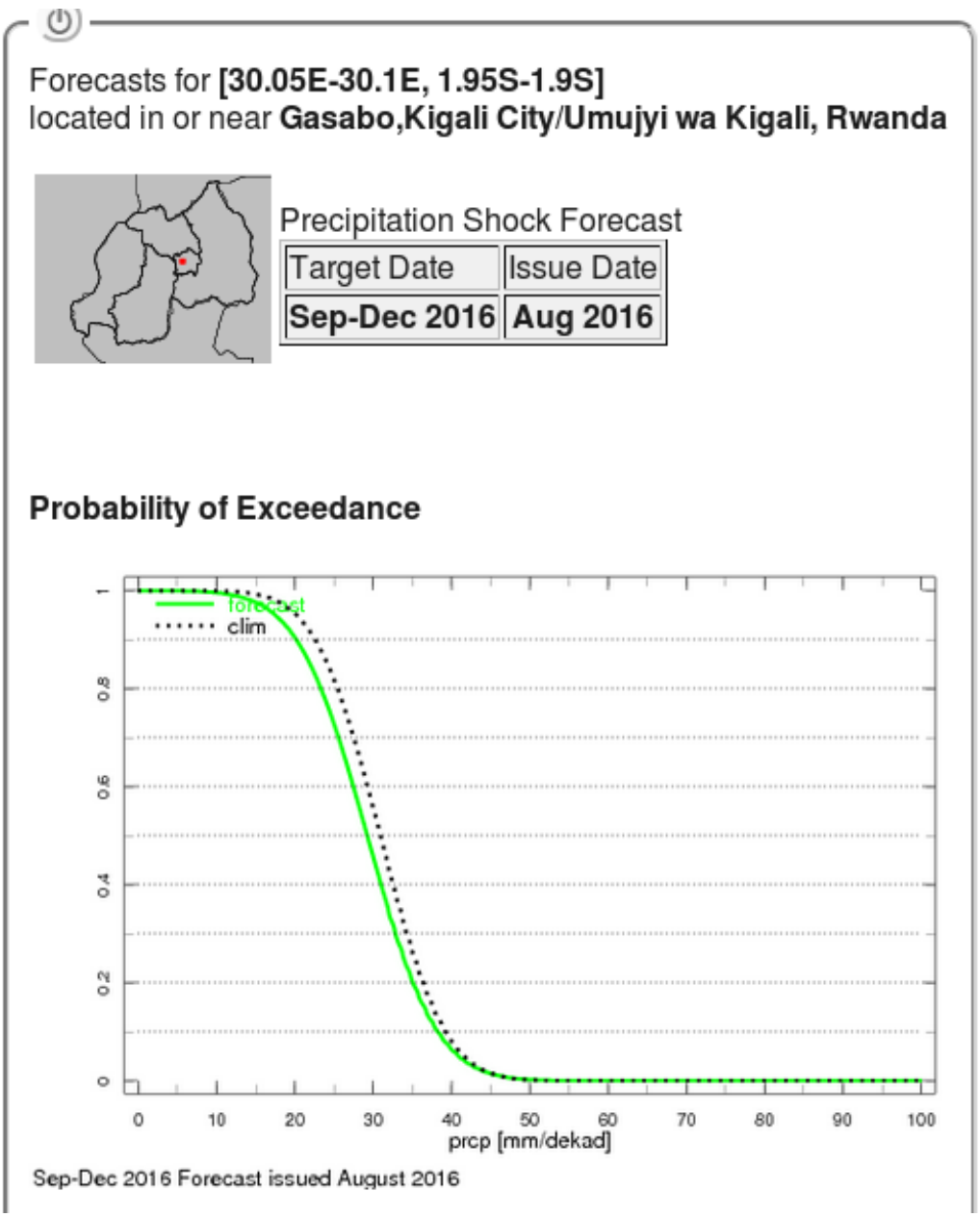

Figure 5. Downscaled seasonal forecast in probability of exceedance format.

The visit also included presentations at Meteo Rwanda, including on the basic architecture of the Data Library, the essential software services needed to keep the ENACTS Data Library server running, and how to use the ENACTS back-up server for data extraction. In addition, an internal Data Library server for ENACTS data access by Meteo Rwanda staff was installed, and Google Analytics was installed and is now being monitored.

Conclusion

The ENACTS Agriculture Maprooms workshop with the Rwanda Agriculture Board, MINAGRI, and CIAT was very fruitful. The participants engaged in spirited discussions, and they will be a great resource at Meteo Rwanda as it expands its climate services into the agriculture sector. The group made a number of specific recommendations for the maproom to make it easier to use. Training on Meteo Rwanda's Data Library and maproom installation also went well.

Appendix 1: Participant List

Name	Organization	Gender
Bernard S. Musana	Rwanda Agriculture Board	M
Aimable Gahigi	Rwanda Agriculture Board	M
Gislain Tenge Ngoga	Rwanda Agriculture Board	M
Rugira Christophe	MINAGRI / PASP Project / SPIU	M
Amos Uwizeye	Meteo Rwanda	M
Frank Rusanganwa	Meteo Rwanda	M
Felix Ndabarasa	Meteo Rwanda	M
Ernest Bagambiki	Meteo Rwanda	M
Joseph Hazabintwari	Meteo Rwanda	M
Desire Kagabo	CIAT	M
Gloriose Nsengiyumva	CIAT	F
Floribert Vuguziga	Meteo Rwanda	M

Appendix 2: Daily Programme

March 2: Introduce the new Historical Onset Date Maproom at CIAT. Begin basic exercises using the maproom for rainy seasons MAM and SOND.

March 3: Continue with exercises using the Onset Date Maproom and conduct a question and answer session.

March 6.: Present the basic architecture of the Data Library at Meteo Rwanda. Present the essential software services needed to keep the ENACTS Data Library server running. Describe how to start and stop the services, and which log files to check when a service stops running.

March 7: Attended a CIAT stakeholder's workshop to describe the Historical Onset Maproom to the attendees. Began training at Meteo Rwanda on making a backup of the Data Library system and the ENACTS data. Introduced Google Analytics and what it can monitor. Began installation of the Seasonal Forecast Maproom on the ENACTS server.

March 8: Training at Meteo Rwanda on setting up and using the ENACTS backup server for data extraction. Continued with the installation of the Seasonal Forecast Maproom.

March 9: Introduced the new Seasonal Forecast Maproom to the attendees at CIAT.

March 10.: Training and group discussion on the Seasonal Forecast Maproom.